Department of Computing
Course 112 - Hardware
Tutorial 1

This tutorial is not assessed.

LAST NAME_____INITIALS_____GROUP_____

1. On my last visit to the National Film theatre I noticed that my ticket had the following instruction printed on it:

" Enter through door 1 and door 3 "

As I was unable to carry out this instruction I spent the evening in the lobby and missed the film. However, it didn't matter since it was a Woody Allen production.

What should the instruction have said?

2. De Morgan's Theorem for three variables states: **(A+B+C)' = A'•B'•C'**

Prove the theorem by constructing a truth table for each term.

A B C	A + B + C	(A + B + C)'	A'	B'	C'	A'•B'•C'
0 0 0						
0 0 1						
0 1 0						
0 1 1						
1 0 0						
1 0 1						
1 1 0						
1 1 1						

3. Given that you know that variables A and B can only take the values 0 and 1, write implementation using normal arithmetic for the boolean expressions:

A• B'
A + B
A' + B'
A eor B
where eor means exclusive or and is defined by the following truth table

eor	0	1
0	0	1
1	1	0

4. The a la carte menu in a well known restaurant offers the following choices for desert:

Coffee with either biscuits and either cheese or ice cream or fresh fruit or apple pie

Clarify the meaning by formalising the statement into a proposition. Simplify it and put it back into words. (Your neighbour may not agree with your interpretation)

Optional: Can you generalise your proof of de Morgan's theorem in Problem 2 to any number of variables?